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| 10/779,682      | 02/18/2004  | Shinya Ono           | 2611-0211P          | 8545             |

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| 2292                          | 7590 | 08/10/2007 |
| BIRCH STEWART KOLASCH & BIRCH |      |            |
| PO BOX 747                    |      |            |
| FALLS CHURCH, VA 22040-0747   |      |            |

|                   |  |
|-------------------|--|
| EXAMINER          |  |
| DHARIA, PRABODH M |  |

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
| 2629     |              |

|                   |               |
|-------------------|---------------|
| NOTIFICATION DATE | DELIVERY MODE |
| 08/10/2007        | ELECTRONIC    |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

## Office Action Summary

**Application No.**

10/779,682

**Applicant(s)**

ONO ET AL.

**Examiner**

Prabodh M. Dharia

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-15 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

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1. **Status:** Receipt is acknowledged of papers submitted on 06-14-2007 under amendments and request for reconsideration, which have been placed of record in the file. Please all the replies and correspondence should be addressed to examiner's new art unit 2629. Claims 1-15 are pending in this action.

***Response to Amendment***

2. Applicant has amended claims 1 and added new claims 14,15. The amended claim 1 and added new claim 14,15 do not introduce new matters into the disclosure. The added material is supported by the original disclosure.

3. Examiner did request telephonic interview with applicant's representative to discuss the applicant's argument, added new claims and newly searched prior arts. Applicant representative requested application specific data, which examiner immediately replied with; however, applicant's representative failed to respond in due time.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 14 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Hunter et al. (US 2001/0026251).

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Regarding Claim 14, Hunter discloses driving method comprising: providing an image display apparatus that includes a plurality of pixels (page 1, paragraph 7), each pixel including a current controlled light emitting element and a driver element driving the current-controlled light emitting element page 1, paragraphs 8-10), and a conductive member that is electrically and commonly connected to the plural driver elements (page 2, paragraphs 34-38); and measuring a potential variation of the conductive member to obtain threshold voltages of the driver elements electrically connected to the conductive member (page 1, paragraphs 8-12, and page 3, teaches need for threshold voltage obtaining unit and describes threshold voltage obtaining unit and paragraph 5 discloses electrical characteristic of unpredictabilities of the semiconductor)

Regarding Claim 15, Hunter discloses the potential variation of the conductive member occurs due to a cause including one of a current flowing to the conductive member and a current flowing from the conductive member through the driver elements (page 1, paragraphs 8-12, and page 3, teaches need for threshold voltage obtaining unit and describes threshold voltage obtaining unit and paragraph 5 discloses electrical characteristic of unpredictabilities of the semiconductor).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 1-5 and 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunter et al. (US 2001/0026251) in view of Yumoto (US 2002/0195964 A1).

Regarding Claim 1,6 and 9 Hunter et al. teaches an image display apparatus (page 2, paragraph 32, Lines 1,2, paragraphs 35,37,16, page 3, paragraph 41, page 4, paragraphs 51,52 and page 1, paragraphs 11-13,15,16, figures 2-6) comprising: a current-controlled light emitting element that emits light (page 2, paragraph 35, Lines 4-6) with a brightness corresponding to a current flowing (page 2, paragraph 35, Lines 5,6) in the current-controlled light emitting element (page 2, paragraphs 35,36); a driver element that includes at least first and second terminals (page 2, paragraph 37) and controls the current flowing into the electric light emitting element based on a potential difference applied between the terminals page 2, paragraph 37, page 3, paragraph 40); a data line that supplies a potential to the first terminal; and a conductive member that is electrically connected to the second terminal (gate and source or drain of the TFT); and a threshold voltage obtaining unit that obtains a threshold voltage of the driver element (page 1, paragraphs 8-12,15) based on the potential of the conductive member (channel formed between source and drain conducts the current) corresponding to an amount of charges supplied from the current source to the second terminal (page 4, paragraphs 51,52, page 3, paragraph 41, page 1, paragraphs 11-13 and 15,16, page 2, paragraph 16).; the data line supplies a potential to the first terminal so that a voltage between the first terminal and the second terminal becomes a potential obtained by multiplying a sum of the threshold voltage obtained by the threshold voltage obtaining unit (page 4, paragraph 52, page 3, paragraph 41).

However, Hunter et al. regarding claim 1, fails to disclose specifically current controlled light emitting element that emits light with a brightness corresponding to a current flowing in the current-controlled light emitting element.

However Yumoto recites and discloses current controlled light emitting element that emits light with a brightness corresponding to a current flowing in (page 1, paragraph 1).

The motivation to combine Hunter et al. with Yumoto as Yumoto addresses specifically the control of the brightness and monitors the parameters of the TFT to determine the current and threshold voltage required which allows to control luminous brightness of the OLED accurately. Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Yumoto in teaching of Hunter et al. to able to have an image displaying unit control brightness accurately such that display unit realizes accurate black levels and gradation around the black levels throughout the data lines regardless of variations present in the data line driving circuit, and thus display an image with smaller variations in brightness.

Regarding Claim 2, Hunter et al. teaches the driver element becomes on-state by applying a potential higher than an estimated threshold voltage, between the first terminal and the second terminal (gate and source of the TFT) upon starting to obtain the threshold voltage (page 1, paragraphs 8-10), and the conductive member (channel formed between source and drain conducts the current) whose potential rises by accumulating charges supplied from the current source through the driver element (page 1, paragraphs 8-11) and the current-controlled light emitting element so that the potential difference between the first and second terminal of the driver element shifts to the threshold voltage (page1, paragraphs 8-12, page 3, paragraphs 39-41,

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page 2, paragraphs 35,36).

Regarding Claim 3, Hunter et al. teaches the driver element becomes off-state caused by rising of the potential of the conductive member up to a predetermined potential after the driver element becomes on-state, and the threshold voltage obtaining unit obtains a threshold voltage based on the potential of the conductive member after the driver element becomes off-state (page 4, paragraphs 51,52, page 1 paragraphs 8-12, page 3, paragraphs 39-41 specifically teaches the circuit is implemented using capacitors and transistors and can therefore be integrated onto the display device active plate, and variations across the plate giving rise to transistor threshold variations are compensated, the when driving device is on the threshold voltages are compensated until the specific pixel is deselected).

Regarding Claim 4, Hunter et al. teaches the threshold voltage obtaining unit obtains a threshold voltage based on potentials of the conductive member at two or more different times after the driver element becomes on-state and before the driver element becomes off-state caused by rising of the potential of the conductive member up to a predetermined potential (page 1, paragraphs 9-12, teaches the capacitor is charged while the conductive element is on, page 4, paragraphs 51-59 it does adjust charged capacitor voltage until the proper threshold achieved, page 1, paragraphs 8-12 and page 3, paragraphs 39-41 since it is compensating threshold voltages continuously i.e. it is obtaining required threshold voltages multiple during driver on time).

Regarding Claim 5, Hunter et al. teaches the threshold voltage obtaining unit obtains a threshold voltage using a total sum of a capacitance of the second terminal and a capacitance of a capacitor electrically connected to the conductive member and a potential applied to the first terminal, as parameters (page 1, paragraphs 8-12, page 5, paragraph 70-77, page 6, paragraph 77, page 1, paragraphs 8-12 page 3, paragraphs 39-41 specifically teaches the circuit is implemented using capacitors (include all the capacitors due to wiring, driver junction light emitting element and threshold capacitor) transistors and can therefore be integrated onto the display device active plate, and variations across the plate giving rise to transistor threshold variations are compensated).

Regarding Claim 7, Hunter et al. teaches a database in which potentials of the conductive member and threshold voltages of the driver element are associated with each other, wherein the threshold voltage obtaining unit obtains a threshold voltage by referring to the database based on the potentials of the conductive member at one or more times after the driver element becomes on-state (page 4, paragraphs 51-54 and 58-62 teaches to obtain threshold voltage pre-determined (or database)  $V_{ref}$  voltage is used to obtain appropriate threshold).

Regarding Claim 8, Hunter et al. teaches a potential is supplied to the first terminal upon displaying an image so that a voltage between the first terminal and the second terminal becomes a sum of the threshold voltage obtained by the threshold voltage obtaining unit and a data voltage corresponding to a display image (page 4, paragraphs 51-54, page 5, paragraph 70-77, page 6,



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paragraph 77).

Further regarding Claim 9, Yumoto also recites and discloses a data voltage corresponding to a display image, by a value determined based on the mobility in the current passage portion of the driver element and the coefficient according to the shape of the current passage portion (page 6, paragraphs 85-92).

Regarding Claim 10, Hunter et al. teaches a constant potential supply unit that supplies a substantially constant potential upon displaying an image; and a switching unit that establishes a connection between the constant potential supply unit and the conductive member upon displaying the image, and isolates the constant potential supply unit from the conductive member upon obtaining the threshold voltage (page 4, paragraph 52, page 3, paragraph 41).

Regarding Claim 11, Hunter et al. teaches the driver element is a thin film transistor which includes a gate electrode, a source electrode, and a drain electrode, the first terminal corresponds to the gate electrode, and the second terminal corresponds to the source electrode (page 3, paragraph 41, Lines 1-7, 12-14).

Regarding Claim 12, Hunter et al. teaches the current-controlled light emitting element is an organic electro-luminescence element (page 2, paragraph 34, Lines 1-3).

Regarding Claim 13, Hunter et al. teaches an image display apparatus (page 2, paragraph 32, Lines 1,2, paragraphs 35,37,16, page 3, paragraph 41, page 4, paragraphs 51,52 and page 1, paragraphs 11-13,15,16, figures 2-6) comprising: a current-controlled light emitting element that emits light (page 2, paragraph 35, Lines 4-6) with a brightness corresponding to a current flowing (page 2, paragraph 35, Lines 5,6) in the current-controlled light emitting element (page 2, paragraphs 35,36); teaches the driver element becomes on-state by applying a potential higher than an estimated threshold voltage, between the first terminal and the second terminal (gate and source of the TFT) upon starting to obtain the threshold voltage (page 1, paragraphs 8-10), and the conductive member (channel formed between source and drain conducts the current) whose potential rises by accumulating charges supplied from the current source through the driver element (page 1, paragraphs 8-11) and the current-controlled light emitting element so that the potential difference between the first and second terminal of the driver element shifts to the threshold voltage (page1, paragraphs 8-12, page 3, paragraphs 39-41, page 2, paragraphs 35,36) and a data line that supplies a potential to the first terminal, and a conductive member that is electrically connected to the second terminal (page 1, paragraphs 14,16); and a threshold voltage obtaining unit that calculates a threshold voltage of the driver element based on the potential of the conductive member corresponding to an amount of charges supplied from a current source to the second terminal (page 1, paragraphs 8-12, page 5, paragraph 70-77, page 6, paragraph 77, page 1, paragraphs 8-12 page 3, paragraphs 39-41 specifically teaches the circuit is implemented using capacitors (include all the capacitors due to wiring, driver junction light emitting element and threshold capacitor) transistors and can therefore be integrated onto the display device active

plate, and variations across the plate giving rise to transistor threshold variations are compensated).

However, Hunter et al. regarding claim 1, fails to disclose specifically current controlled light emitting element that emits light with a brightness corresponding to a current flowing in the current-controlled light emitting element.

However Yumoto recites and discloses current controlled light emitting element that emits light with a brightness corresponding to a current flowing in the current-controlled light emitting element (page 1, paragraph 1).

The motivation to combine Hunter et al. with Yumoto as Yumoto addresses specifically the control of the brightness and monitors the parameters of the TFT to determine the current and threshold voltage required which allows to control luminous brightness of the OLED accurately.

Thus it is obvious to one in the ordinary skill in the art at the time of invention was made to incorporate teaching of Yumoto in teaching of Hunter et al. to able to have a an image displaying unit control brightness accurately such that display unit realizes accurate black levels and gradation around the black levels throughout the data lines regardless of variations present in the data line driving circuit, and thus display an image with smaller variations in brightness.

### ***Response to Arguments***

8. Applicant remark regarding claim 13 being listed in Item 4 is an error is persuasive.

Examiner does agree the claim 13 being listed in Item 4 is innocent typographical error.

9. Applicant argues Yumoto fails to disclose the threshold voltage obtaining unit.

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Examiner argues back as Yumoto was introduced to address the issue of current controlled light emitting element that emits light with a brightness corresponding to a current flowing in the current-controlled light emitting element.

However, the **threshold voltage obtaining unit** is well known in the art (please see Sakamoto (US 4,827,351), Col. 1, Lines 29-59, Col. 3, Lines 16-31; Friedman (US 6,040,809) please see abstract, Col. 5, Lines 32-46, Col. 6, Lines 16-64; Suzuki et al. (US 2001/0048073 A1) page 2, paragraph 22, page 4, paragraph 46, page 5, Claim 2).

10. Applicant argues Hunter et al. and Yumoto fails to disclose regarding threshold voltage obtaining unit located outside the display region.

Examiner argues back, since applicant cancelled the above recited limitation in independent claim 1, the argument is moot. However, arguments filed on 06-14-2007 on page 9, paragraph 4, applicant admits the circuits in Figs. 6 and 7 are located outside the display region.

11. Applicant's arguments regarding claim 13; see remark on pages 9 and 10; filed on 06-14-2007, have been fully considered and are not persuasive.

Applicant argues regarding claims 13 as to Hunter et al. fails to disclose threshold voltage obtaining unit for the pixel and pixel driver unit.

Examiner disagrees Hunter et al. discloses the pixel is light emitting element the threshold voltage obtaining unit, (please see figures 1-3 and 14, page 3, paragraph 39-41). Hunter further discloses on page 3, paragraph 41, **during the sampling phase, the switches 32 and 37 are closed, which diode-connects the transistor 30, and the switch 33 is open, which isolates**

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the display element load. An input signal, corresponding to the required display element current and denoted here as  $lin$ , is drawn through the transistor 30 from an external source, e.g. the column driver circuit 8 in FIG. 1, via the input line 35, the closed switch 37 and the input terminal 36. Because the transistor 30 is diode-connected by virtue of the closed switch 32, the voltage across the capacitance 38 at the steady state condition will be the gate-source voltage that is required to drive a current  $lin$  through the channel of the transistor 30. Having allowed sufficient time for this current to stabilise, the sampling phase is terminated upon the opening of the switches 32 and 37 isolating the input terminal 36 from the input line 35 and isolating the capacitance 38 so that the gate-source voltage, determined in accordance with the input signal  $lin$ , is stored in the capacitance 38. The output phase then begins upon the closing of the switch 33 thus connecting the display element anode to the drain of the transistor 30. The transistor 30 then operates as a current source and a current approximately equal to  $lin$  is driven through the display element 20.

The reason driver unit is isolated as Hunter et al. very clearly explains that the TFT or switching element electrical characteristic (as for example threshold) is unpredictable (page 1, paragraph 5). Hunter isolates pixel driver unit until capacitor is charged to support threshold voltage required to drive necessary current through driving transistor (the channel formed between drain and source) to light up light emitting element. That is to say the threshold voltage obtaining unit makes sure the capacitor driving the pixel and driving unit is charged to required voltage that is above threshold voltage to light the light emitting element continuously.

*Allowable Subject Matter*

12. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

After further search in US PG PUB and prior art and consideration; the prior art of (Hunter et al. (US 2001/0026251) in view of Yumoto (US 2002/0195964 A1) and Oomura; Masanobu (US 6,693,388 B2), cited prior art on 892's, 1449's and PG PUB fails to recite or disclose the uniquely distinct features of the independent claims limitations bold and underlined below with all the other limitations recited above in independent claim 1:

**the threshold voltage obtaining unit obtains the threshold voltage, and obtains a mobility in a current passage portion of the driver element and a coefficient according to a shape of the current passage portion.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prabodh M. Dharia whose telephone number is 571-272-7668. The examiner can normally be reached on M-F 8AM to 5PM.

16. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

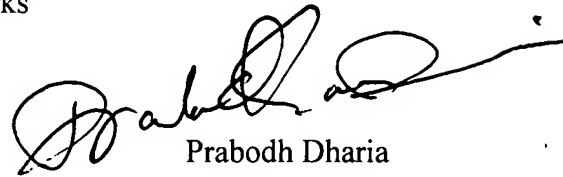
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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

A handwritten signature in black ink, appearing to read 'Prabodh Dharia', with a long horizontal flourish extending to the right.

Prabodh Dharia

Full Signatory Authority Program

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08-05-2007